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(71) Applicants
Hellenic Industrial Technical Commercial & Mining Sharing Company Amiantit SA,
Omirou str. 13, Athens, Greece
(72) Inventor
Constantinos George Vergopoulos
(74) Agents
Reginald W. Barker & Co.,
13, Charterhouse Square, London EC1M 6BA

# (54) Laminated cement sheet construction

(57) A laminated cement sheet 29 is integrated with a pre-finished surface layer 27 of synthetic plastics material, for example melamine impregnated paper, the laminating being effected in a thermal press typically by applying the impregnated paper sheet to a compressed asbestos cement sheet to apply thereto any inherent colour, pattern or decoration applied to, or incorporated in, the sheet, a sheet 28 of glass cloth or synthetic tissue impregnated with a phenolic resin being interposed therebetween.

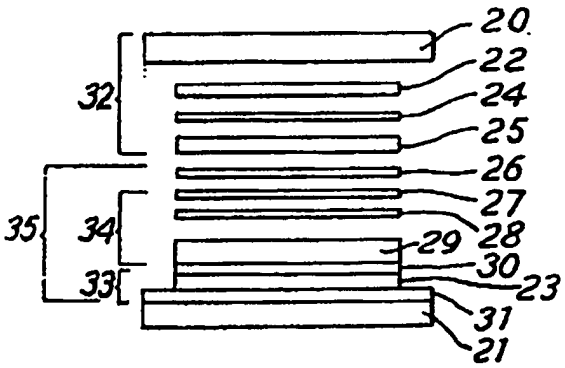


FIG. 2

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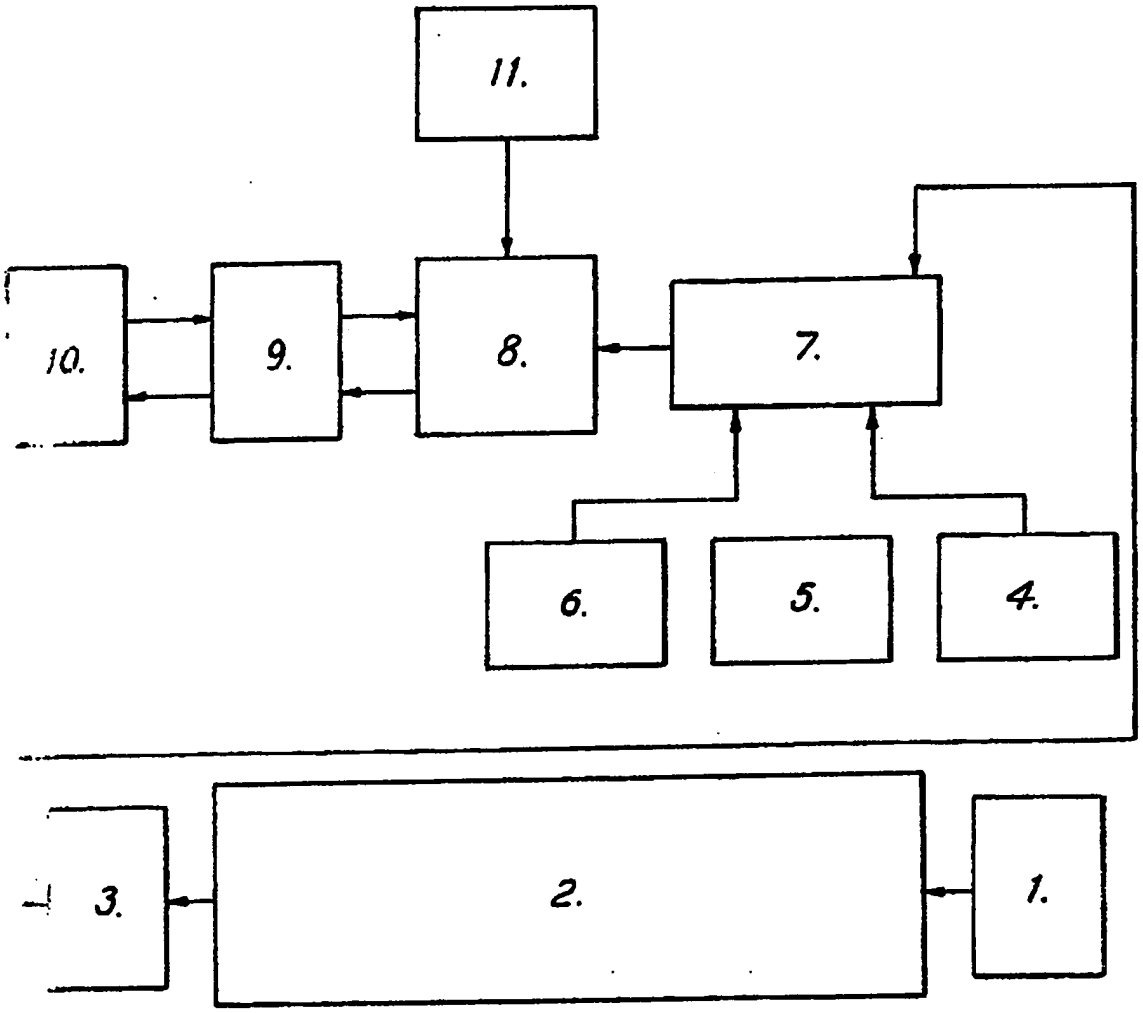


FIG.1

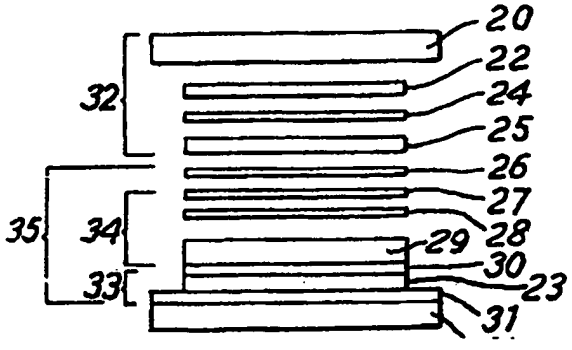


FIG.2

SPECIFICATION

# Laminated cement sheet construction

This invention relates to the construction and method of production of laminated cement sheets, and is particularly, but not exclusively, concerned with the construction and production of compressed asbestos cement sheets, laminated with a melamine layer, although the invention is generally applicable to any kind of lamination incorporating asbestos cement sheet material. The cement asbestos ratio in such cement sheet may vary, with optional additives such as cellulose, silica, fibre glass and polypropylene.

Although cement sheeting, and in particular asbestos cement sheeting, may find application as a cladding material in the construction or building industry, the surface finish is not generally acceptable as a final or finished coat to a wall covering, without the application of additional finishing compound or further sheet material. This is a time-consuming and expensive means by which to achieve the necessary colour and pattern finish on the surface. Further, the application of an additional surface coat or covering is an on-going maintenance item and any finish applied must desirably not impede the flame-resistant, fire-retardant properties of the asbestor cement sheet itself.

According to one aspect of the present invention, a laminated cement sheet incorporates a layer of synthetic plastics material and an integral finishing surface on at least one side or surface thereof.

Preferably, the lamination of synthetic plastics material comprises a paper sheet impregnated with melamine. Specifically, it is desirable that such melamine impregnated paper sheet should be of a specification expressed by the formula 80/200, indicating that the mass of melamine is 1.5 times the mass of alpha cellulose. Further it is desirable that the total thickness of this impregnated layer should be in the range 4/8—7/8 mm.

According to another aspect of the invention there is provided a method of producing a laminated asbestos sheet, comprising the steps of pressing a layer of the synthetic plastics material against the surface of a cement sheet.

In a preferred method, a paper sheet impregnated with melamine is applied to and pressed against a cement sheet to integrate the melamine impregnated sheet as a lamination with the cement sheet to transfer thereto any inherent colour, pattern or decoration applied to, or incorporated in, the melamine sheet.

In practice, preferably an intervening layer, for example of glass cloth or other thin synthetic tissue, is applied between the melamine impregnated sheet and the cement sheet, in order to prevent reaction between the alkali character of the cement sheet with the acidic character of the melamine.

In the pressing step, an intervening non-stick sheet, for example of an aluminium foil or silicone or paraffin impregnated paper, is applied to the melamine surface to avoid melamine polymerisation.

Desirably, the pressing stage involves the simultaneous application of heat and pressure for example a pressure of 35—40 bars is applied for ten minutes at a temperature of 135°—140°C.

There now follows a description of a particular embodiment of the invention, by way of example only, with reference to, and as shown in the accompanying diagrammatic drawing, in which:

Figure 1 shows in block schematic form the process steps according to one embodiment of the invention, and Figure 2 shows the laminated assembly or sandwich in the pressing stage.

Referring to the drawings, a laminated cement sheet, and in particular a laminated compressed asbestos cement sheet, which is generally flat or planar in character, is produced by applying a surface finish comprising layers of synthetic plastics material. Specifically, an asbestor cement sheet 1 is subjected to a special drying process 2, in which its humidity is decreased below 7%, for example by the so-called COGAS method, to produce a sheet 3, which is subjected to a laminating stage as follows:

Successive layers of material are applied to the dried sheet 3 on each side thereof, to produce a laminated sandwich, as shown in Figure 2, which is located generally between the opposed faces 20 and 21 of a heated pressing slab. The laminated sandwich may be regarded as comprising three parts, namely a collection of press laminations 32 and 33 (incorporating layers 22, 24, 25 and 23, 30, 31 respectively) together in a collection of product laminations 34, which will be integrated to form the final laminated asbestos cement sheet product.

Thus the product lamination sandwich 34 comprises an asbestos cement flat sheet 29 at the process stage 3 after drying, a melamine impregnated paper sheet 27 and an intervening inert or inactive barrier layer 28 comprising an impregnated glass cloth or synthetic tissue, preferably of a thickness ranging from between 350 to 400 microns, and a density of about 40 gr/m$^2$, impregnated in 120—130 gr/m$^2$ of a suitable phenol-formaldehyde based resin, to prevent reaction between the alkaline character of the cement sheet and the acidic character of the melamine. Furthermore, this barrier film of glass cloth or other thin synthetic tissue, helps to achieve a good surface finish over the microscopic surface irregularities of a typical asbestos cement sheet.

The application of the barrier layer is represented by process stage 4 and the application of the melamine paper layer by process stage 5. This paper layer comprises a paper sheet impregnated with melamine 80/200, a numerical formula indicating that the mass of melamine is 1.5 times the mass of alpha cellulose in the paper; the total thickness of this layer ranging between 4/8 to 7/8 mm.

Process stage 6 comprises the application of a

non-stick sheet 26 of aluminium foil or silicone or paraffin impregnated paper, to avoid melamine polymerisation on the pressure slabs 20/21 of the press (not shown in full, but which is capable of simultaneously applying both high pressure and temperature conditions).

In the next process stage a pressure bolster 25, comprising a rubber sheet covered with a polyester tissue, to produce an overall thickness of 5—6 mm, is applied between the press slab 20 and the upper layer of the laminated product package 34 to distribute the pressure evenly across the surface of the asbestos cement sheet 29, notwithstanding the aforementioned microscopic surface irregularities thereof.

The layers 26, 27, 28 and 29 comprise part of a package represented by process stage 7, which is applied to the press during the process stage 8; the remaining parts of the package comprising heat distributing metal mesh 30 and an asbestos cloth 23 on the underside of the asbestos cement sheet 29 — i.e. the opposite side to the melamine layer, in order to distribute the heat of the pressure slab 21 uniformly over the surface of the asbestos sheet 29 and the asbestos cloth 23 avoids undue application of heat not directly required for the lamination integration process. A corresponding asbestos cloth layer 22 is located on the opposite side of the package 35.

A steel sheet 31 is interposed between the press slab 21 and the package 35 for convenience of transportation during the process and a further, pressure distributing steel sheet 24 is arranged at the opposite side of the package 35.

Process stages 8 and 9 represent the introduction of the laminated package 35 into a special press 10, which can receive and press simultaneously five such packages 35.

The press 10 is capable of applying a pressure of 35 to 40 bars for 10 minutes at a temperature of between 135°—140°C, as a result of which any colouration, decoration, pattern or ornament applied to the melamine sheet is incorporated as a surface finish to the asbestos sheet 29, to achieve a prefinished building or construction sheet material as the end product represented by process stage 11.

The colour, pattern, ornament or decoration of surface finish, together with the size and thickness of sheet can of course be varied according to specific requirements.

It will be appreciated that a prefinished cement sheet according to the present invention avoids the need for subsequent plastering on panelled or clad walls and indeed for subsequent decoration such as wall painting, and attendant surface preparation. Maintenance costs are similarly low, since no repainting is required nor application of wall paper covering.

It the sheet is applied to a wall, by means of fixing battens, the resulting air gap provides a highly efficient thermal insulation layer.

The sheet nature of the cladding enables easy positioning and fixing.

The nature of the finished surface is such that it may easily be kept clean by washing/wiping and the strength and stability of the asbestos cement sheet is not impaired and moreover may be adjusted to the particular construction requirements.

Finally, the melamine and the asbestos sheet layers are non-combustible and fire retardant and thus the assembled laminated package has similar properties.

CLAIMS

1. A laminated cement sheet incorporating a layer of synthetic plastics material and an integral finishing surface on at least one side or surface thereof.

2. A laminated cement sheet, as claimed in Claim 1, wherein the lamination of synthetic plastics material comprises a paper sheet impregnated with melamine.

3. A laminated cement sheet, as claimed in Claim 2 wherein said melamine impregnated paper sheet is of a specification expressed by the formula 80/200, indicating that the mass of melamine is 1.5 times the mass of alpha cellulose.

4. A laminated cement sheet, as claimed in Claim 3, wherein the total thickness of this impregnated layer should be in the range 4/8—7/8 mm.

5. A method of producing a laminated cement sheet, comprising the steps of pressing a layer of the synthetic plastics material against the surface of a cement sheet.

6. A method of producing a laminated cement sheet, as claimed in Claim 5, wherein a paper sheet impregnated with melamine is applied to and pressed against a cement sheet to integrate the melamine impregnated sheet as a lamination with the cement sheet to transfer thereto any inherent colour, pattern or decoration applied to, or incorporated in the melamine sheet.

7. A method of producing a laminated cement sheet, as claimed in Claim 6, wherein an intervening layer of glass cloth or other thin synthetic tissue, is applied between the melamine impregnated sheet and the cement sheet, in order to prevent reaction between the alkali character of the cement sheet with the acidic character of the melamine.

8. A method of producing a laminated cement sheet, as claimed in Claim 7, wherein an intervening non-stick sheet of an aluminium foil or silicone or paraffin impregnated paper, is applied to the melamine surface to avoid melamine polymerisation.

9. A method of producing a laminated cement sheet, as claimed in any of Claims 5 to 8, wherein the pressing stage involving the simultaneous application of heat and pressure; for example a pressure of 35—40 bars is applied for ten minutes at a temperature of 135°—140°C.

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